

CLAIMS

What is claimed is:

1. A loudspeaker, comprising:
 - 5 a passive radiator integrated with a transducer, where the passive radiator is mechanically isolated from the transducer.
 2. The loudspeaker of Claim 1,
 - 10 where the transducer has an outside perimeter mounted on a support mechanism; and where the passive radiator has a rigid body with an inside perimeter connected to an inside surround, the inside surround is connected to the support mechanism, and the inside perimeter of the passive radiator encloses at least one location on the outside perimeter of the transducer.
 3. The loudspeaker of Claim 2, where the inside perimeter encloses every location on the outside perimeter.
 4. The loudspeaker of Claim 1,
 - 15 where the transducer is mounted on a support mechanism connected to a speaker enclosure; and where the passive radiator is connected to the support mechanism and to a speaker enclosure.
 5. The loudspeaker of Claim 1,
 - 20 where the transducer has a transducer surround connected between a cone and a transducer frame; and where the transducer frame is mounted on the support mechanism.
 6. The loudspeaker of Claim 1,
 - 25 where the transducer is mounted on a support mechanism; where the passive radiator has a rigid body with an inside perimeter and an outside perimeter, the inside perimeter connected to an inside surround, the outside perimeter

connected to an outside surround, where the inside surround is connected to the support mechanism, and where the outside surround is connected to a frame.

7. The loudspeaker of Claim 6, where the inside perimeter has a circular shape.

8. The loudspeaker of Claim 7, where the transducer has a circular shape.

5 9. The loudspeaker of Claim 6, where the outside perimeter has a circular shape.

10. The loudspeaker of Claim 6, where the outside perimeter has a rectangular shape.

11. The loudspeaker of Claim 1, where the transducer has a low frequency range.

12. The loudspeaker of Claim 11, where the low frequency range is below about 50 Hz.

13. The loudspeaker of Claim 1, where the transducer has a midrange frequency range.

10 14. The loudspeaker of Claim 13, where the midrange frequency range is in the range of about 40 Hz to about 2800 Hz.

15. The loudspeaker of Claim 1, where the passive radiator resonates at an acoustical frequency below a cutoff frequency for the transducer.

16. A loudspeaker, comprising:

15 a speaker enclosure having a back side and a frame;
a support mechanism connected to the back side of the speaker enclosure;
a transducer having an outside perimeter mounted to the support mechanism; and
a passive radiator having an inside perimeter connected to the support mechanism,
where the inside perimeter of the passive radiator encloses at least one point on the outside
20 perimeter of the transducer and the passive radiator is connected to the frame.

17. The loudspeaker of Claim 16, where the speaker enclosure has a rectangular shape.

18. The loudspeaker of Claim 16, where the speaker enclosure has an oval shape.
19. The loudspeaker of Claim 16,
where the support mechanism has at least one base connected to at least one support element;
5 where the transducer is connect to the at least one base; and
where the at least one support element is connected to the back side of the speaker enclosure.
20. The loudspeaker of Claim 19,
where the at least one base conforms to the shape of the transducer, and
10 where the at least one base conforms to the shape of the passive radiator.
21. The loudspeaker of Claim 19, where the support mechanism has four support elements.
22. The loudspeaker of Claim 19, where the support mechanism has three support elements.
- 15 23. The loudspeaker of Claim 16, where the transducer has a transducer surround connected between a cone and a transducer frame, where the transducer frame is mounted on the support mechanism.
24. The loudspeaker of Claim 16, where the transducer has a low frequency range.
25. The loudspeaker of Claim 24, where the frequency range is less than about 50 Hz.
- 20 26. The loudspeaker of Claim 16, where the transducer has a midrange frequency range.
27. The loudspeaker of Claim 26, where the frequency range is in the range of about 40 Hz to about 2800 Hz.

28. The loudspeaker of Claim 16,
 - where the passive radiator has a rigid body with an inside surround connected along the inside perimeter;
 - where the inside surround is connected to the support mechanism; and
 - where the passive radiator has an outside surround connected to an outside perimeter of the rigid body, the outside surround connected to a frame.
- 5 29. The loudspeaker of Claim 16, where the inside perimeter has a circular shape.
30. The loudspeaker of Claim 29, where the outside perimeter has a circular shape.
31. The loudspeaker of Claim 29, where the outside perimeter has a rectangular shape.
- 10 32. The loudspeaker of Claim 16, where the inside perimeter of the passive radiator encloses every point on the outside perimeter of the transducer.
33. The loudspeaker of Claim 16, where the passive radiator resonates at an acoustical frequency below a cutoff frequency for the transducer.
- 15 34. An enclosure assembly for a loudspeaker, comprising:
 - a speaker enclosure having a back side and a frame;
 - a support mechanism connected to the back side of the speaker enclosure; and
 - a passive radiator having an inside perimeter connected to the support mechanism, where the inside perimeter of the passive radiator encloses at least one point on the outside perimeter of the support mechanism, the passive radiator connected to the frame.
- 20 35. The enclosure assembly of Claim 34, where the speaker enclosure has a rectangular shape.
36. The enclosure assembly of Claim 34, where the speaker enclosure has an oval shape.

37. The enclosure assembly of Claim 34,
where the support mechanism has at least one base connected to at least one support
element;
5 where the passive radiator is connected to the at least one base; and
where the at least one support element is connected to the back side of the speaker
enclosure.

38. The enclosure assembly of Claim 37, where the base conforms to the of the passive
radiactor.

10 39. The enclosure assembly of Claim 37, where the support mechanism has four support
elements.

40. The enclosure assembly of Claim 37, where the support mechanism has three support
elements.

15 41. The enclosure assembly of Claim 37, where the passive radiator has a rigid body with
an inside surround connected along the inside perimeter, where the inside surround is
connected to the support mechanism, and where the passive radiator has an outside surround
connected to an outside perimeter of the rigid body, where the outside surround is connected
to a frame.

42. The enclosure assembly of Claim 41, where the inside perimeter has a circular shape.

20 43. The enclosure assembly of Claim 42, where the outside perimeter has a circular
shape.

44. The enclosure assembly of Claim 42, where the outside perimeter has a rectangular
shape.

45. The enclosure assembly of Claim 34, where the inside perimeter of the passive
radiactor encloses every point on the outside perimeter of the support mechanism.

46. A speaker assembly for a loudspeaker, comprising:
a support mechanism;
a transducer having an outside perimeter mounted to the support mechanism; and
a passive radiator having an inside perimeter connected to the support mechanism,
where the inside perimeter of the passive radiator encloses at least one point on the outside
perimeter of the transducer, the passive radiator connected to the frame.

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47. The speaker assembly of Claim 46,
where the support mechanism has at least one support element connected to an upper
base and a lower base;
where the outer perimeter of the transducer is connect to the upper base; and
where the lower base holds the transducer.

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48. The speaker assembly of Claim 47, where the upper base conforms to the shape of the
transducer, and where the upper base conforms to the shape of the passive radiator.

49. The speaker assembly of Claim 47, where the support mechanism has four support
elements.

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50. The speaker assembly of Claim 47, where the support mechanism has three support
elements.

51. The speaker assembly of Claim 47, where the transducer has a transducer surround
connected between a cone and a transducer frame, where the transducer frame is mounted on
the support mechanism.

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52. The speaker assembly of Claim 46, where the transducer has a low frequency range.

53. The speaker assembly of Claim 52, where the frequency range is less than about
50 Hz.

54. The speaker assembly of Claim 46, where the transducer has a midrange frequency
range.

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55. The speaker assembly of Claim 55, where the frequency range is in the range of about 40 Hz to about 2800 Hz.

56. The speaker assembly of Claim 46, where the passive radiator has a rigid body with an inside surround connected along the inside perimeter, where the inside surround is connected to the support mechanism, and where the passive radiator has an outside surround connected to an outside perimeter of the rigid body, where the outside surround is connected to a frame.

57. The speaker assembly of Claim 56, where the inside perimeter has a circular shape.

58. The speaker assembly of Claim 57, where the outside perimeter has a circular shape.

10 59. The speaker assembly of Claim 57, where the outside perimeter has a rectangular shape.

60. The speaker assembly of Claim 46, where the inside perimeter of the passive radiator encloses every point on the outside perimeter of the transducer.

15 61. The speaker assembly of Claim 46, where here the passive radiator resonates at an acoustical frequency below a cutoff frequency for the transducer.

62. A method for extending the bass response in a loudspeaker, comprising:
integrating a passive radiator with a transducer;
mechanically isolating the passive radiator from the transducer; and
resonating the passive radiator in response to acoustical energy from the transducer.

20 63. The method of Claim 62, further comprising enclosing at least one point on the outside perimeter of the transducer in an inside perimeter of the passive radiator connected to the frame.

64. The method of Claim 62, further comprising enclosing every point on the outside perimeter of the transducer in an inside perimeter of the passive radiator connected to the frame.

5 65. The method of Claim 62, further comprising resonating the passive radiator at an acoustical frequency below a cutoff frequency for the transducer.

66. The method of Claim 62, further comprising translating vibrations from the passive radiator and the transducer through a support mechanism.

67. The loudspeaker of Claim 62, where the transducer has a low frequency range.

68. The loudspeaker of Claim 62, where the transducer has a midrange frequency range.